

Appl. No. 10/808,802
Amdt. dated 3/21/05
Reply to Office Action of 01/21/2005

Attorney Docket No.: TS03-186
N1085-90102

REMARKS

Claims 1-29 are pending in the present application and each of claims 1-29 has been rejected. Claims 1 and 16 are amended in this paper. Applicants respectfully request re-examination, reconsideration and allowance of each of pending claims 1-29.

5 Applicants would also like to take this opportunity to thank Examiner Gurley for particularly responding to the previously filed Applicants' argument and also for the Examiner's suggestions in response thereto.

I. Claim Objections

10 In the subject Office action, specifically in paragraph 2, claims 1 and 16 were objected to for informalities. Applicants respectfully submit that these objections should be withdrawn for reasons set forth below.

Each of the particular informalities pointed out by the Examiner with respect to claim 1 has been addressed and therefore the objection to claim 1 should be withdrawn.

15 With respect to claim 16, in response to the Examiner's suggestion regarding line 15, applicants respectfully point out that in the response filed 11/1/04, the word "a" that follows "using" was excised by a strikethrough, i.e. a. With respect to the Examiner's suggestions regarding lines 20 and 24, applicants have dutifully inserted "a" between "remove" and "portion" but respectfully submit that the phrases beginning on lines 20 and 24 of amended claim 16 respectively recite: "performing a first step . . . to
20 selectively remove a portion" and "performing a second step . . . to selectively remove a portion". In each instance, "to remove" is the infinitive form of the verb that is the object of "performing" and that this language complies with the requirements of 35 U.S.C. § 112. Applicants respectfully submit that the objection to claim 16 should therefore also be withdrawn.

25 II. Claim Rejections Under 35 U.S.C. §103

The pending set of claims 1-29 includes two independent claims, independent claims 1 and 16. Each of independent claims 1 and 16 has been amended to more

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clearly recite the distinguishing features illustrated in Figure 3 of the application, in particular the feature that the photoresist plug completely fills the via opening up to the top of the via opening. Independent claims 1 and 16 have further been amended to more specifically point out the use of the photoresist shape including the trench-defining shape and photoresist plug, as suggested by the Examiner.

Each of amended independent claims 1 and 16 recite the features of:

"forming a via opening . . . extending downwardly from a top surface...";

"forming a photoresist shape including a trench-defining shape and a photoresist plug that completely fills said via opening up to said top surface"; and

"said trench-defining shape exposing a second portion of said stack of insulator layers".

First and foremost, Applicants point out that none of the cited references disclose or suggest the feature of a photoresist plug that completely fills the via opening, much less a photoresist pattern including both a trench pattern for defining a trench and a photoresist plug that completely fills the via opening. Amended claims 1 and 16 now more particularly point out this feature, in particular that the photoresist plug completely fills the via opening up to the top of the via opening, not just the lower layers of the stack of insulator layers.

The utility and positioning of the photoresist shape in the etching process has also been more particularly recited. Amended independent claim 16 recites the feature of "etching to form a trench opening" and "said trench opening extending downwardly from a top surface of said capping silicon oxide layer and terminating on said surface of said second silicon nitride stop layer". Each of independent claims 1 and 16 also recite the feature of "said trench-defining shape exposing . . . a second portion" and "[forming/ etching to form]¹ a trench opening in said second portion". With these distinguishing

¹ Claim 1 / Claim 16 respectively

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features of Applicant's invention more particularly recited, Applicants believe that the particular claim rejections should be withdrawn as follows.

In the subject Office action, specifically in paragraph 7, claims 1-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang in view of Nagahara. Applicants respectfully submit that these claim rejections should be withdrawn because in the Chang reference, the photoresist plug 30 only partially fills the opening as shown in Figure 2C. Nagahara is relied upon for providing a capping layer in conjunction with an anti-reflection layer and therefore does not make up for the above-stated deficiencies of Chang. Claims 1-29, including amended independent claims 1 and 16 are therefore distinguished from the references of Chang and Nagahara, taken alone or in combination.

The subject Office action further rejects claims 1-29 under 35 U.S.C. §103(a) as being unpatentable over Harada in view of Nagahara in paragraph 8. Applicants respectfully submit that these claims rejections should be withdrawn for reasons set forth below. Similar to Chang, the cited reference of Harada provides photoresist plug 48 which does not completely fill the opening. Again, Nagahara is relied upon for providing a capping layer in conjunction with an anti-reflection layer and Nagahara therefore does not make up for the above-stated deficiencies of Harada. Claims 1-29, are therefore distinguished from the references of Harada and Nagahara, taken alone or in combination.

On page 6, third paragraph of the subject Office action, claims 1-29 were further rejected under 35 U.S.C. §103(a) as being unpatentable over Stamper in view of Nagahara. Applicants respectfully submit that this claim rejection should also be withdrawn because the Office action acknowledges that Stamper fails to teach a photoresist plug. In this rejection, Nagahara is relied upon for providing a sacrificial photoresist plug to protect the via during processing. As shown most clearly in Figures 2A and 2B of Nagahara, after photoresist film 1 is formed as shown in Figure 2A, the develop process removes photoresist from the via of Figure 2B leaving only anti-

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reflective coating 2 to partially fill the via opening. Nagahara therefore fails to disclose or suggest the feature of a photoresist pattern including both a photoresist plug that completely fills a via opening and a trench-defining shape used to define a trench to be formed. Claims 1-29 are therefore distinguished from the references of Stamper and
5 Nagahara, taken alone or in combination.

For reasons set forth above, each of amended independent claims 1 and 16 now more particularly point out features neither disclosed nor suggested in the references, taken alone or in combination. Therefore, the rejection of claims 1 and 16 under 35 U.S.C. § 103(a) should be withdrawn. Each of dependent claims 2-15 depend from
10 claim 1 and each of dependent claims 17-29 depend, directly or indirectly, from amended independent claim 16. The rejection of claims 2-15 and 17-29 under 35 U.S.C. § 103(a), should therefore be withdrawn.

Furthermore, Applicants respectfully submit that the amendments be entered because the application is in condition for allowance and because the amended claims
15 now explicitly recite features that were inherent in the claims prior to amendment.

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CONCLUSION

Based on the foregoing, each of pending claims 1-29 is in allowable form and the application is therefore in condition for allowance, which action is respectfully and expeditiously requested by Applicants.

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Respectfully submitted,

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